Animal Mortality

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What is animal mortality in CAST?

- Nutrients from dead animals
- Routine deaths NOT mass mortality events
  - i.e. avian flu
- Currently there is no independent pool of mortality nutrients

Context:

Why do this?

- Improve CAST simulation of mortality nutrients (Expert Pannel recommendation).

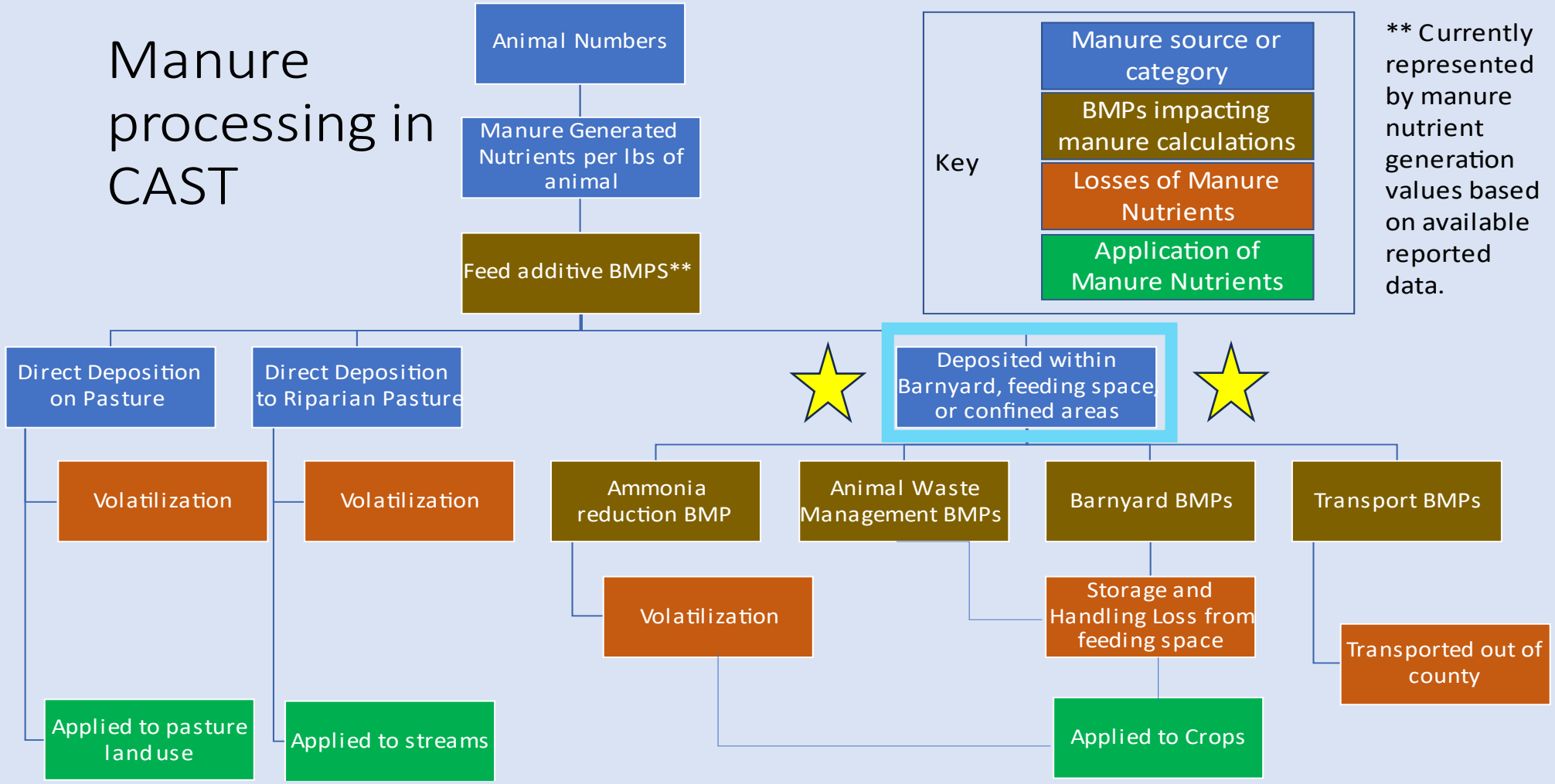
What are we expected to do?

- Decide if we should adopt a different methodology to simulate mortality nutrients.

Animal Mortality Management BMP Expert Panel

1. Routine Mortality Production
   - Mass of mortalities, N, and P per Animal Unit (AU, 1 AU = 1,000 pounds liveweight) per year produced by the most important animal agricultural practices in the Chesapeake Bay Watershed.
2. Disposal Methods
   - N and P reduction efficiencies of selected mortality disposal methods, and categorize the fractional masses of carcass nutrients removed from agricultural systems, recycled by producers in a Nutrient Management Plan (NMP), volatilized to the atmosphere, and leaving the practice by all other pathways (leaching, overland flow, etc.).

Phase 6 implementation



- Manure nutrients stay in their county of origin UNLESS they are transported

Contribution of mortalities to nutrients:

Table ES.1. Estimated weight of mortality nutrients produced by farms on a per AU (1,000 pounds liveweight) basis.

Type of Farm	Characteristic Animal(s)	Weight of Mortality Nutrients Produced per Farm (Lbs. AU^{-1} $year^{-1}$)	
		TN	TP
Poultry			
Broiler	6 lb. Market Birds	1.8	0.25
Layer	Laying Hens	2.2	0.40
Tom Turkey	48 lb. Market Toms	2.5	0.33
Hen Turkey	25 lb. Market Hens	2.5	0.32
Swine	270 lb. Market Hog	1.5	0.34
Cattle			
Cow-Calf Herd	Mother Cow	0.65	0.19
Cattle Feedlot	Heifer and Steer Capacity	0.47	0.14
Dairy	Mature Cows (Milking and Dry)	1.9	0.57
Equidae	1,150 lb. Horse	0.34	0.12

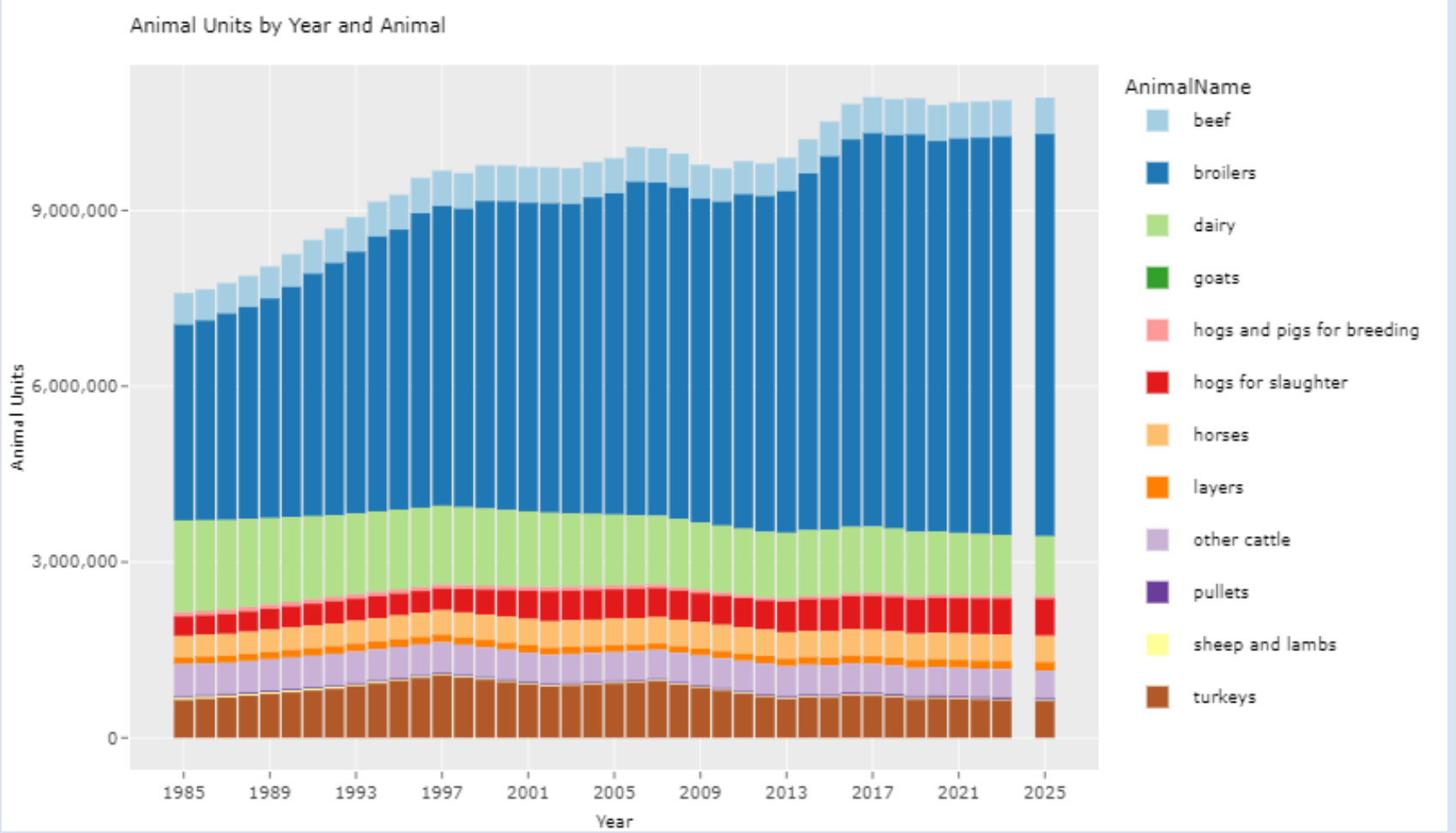
Contribution of mortalities to nutrients:

Table ES.3. Percentage of manure and mortality nitrogen and phosphorus contributed by mortalities for typical animal operations in the Chesapeake Bay Watershed.

Type of Farm	Percentage of Farm Nutrients (Manure and Mortalities) Originating with Mortalities	
	TN	TP
Poultry		
Broiler	1.3 - 2.4	0.65 – 1.2
Layer	0.70	0.40
Turkey	4.0	2.0
Swine	3.2	3.8
Cattle		
Cow-Calf Herd	0.45	0.58
Cattle Feedlot	0.26 – 0.32	0.45 – 0.75
Dairy	0.55 – 0.65	0.93 – 1.2
Equidae	0.30 - 0.52	0.51 – 1.5

Why does this matter?

- Animals exist
- Impact areas relying on mortality disposal



Phase 6 implementation: A problem

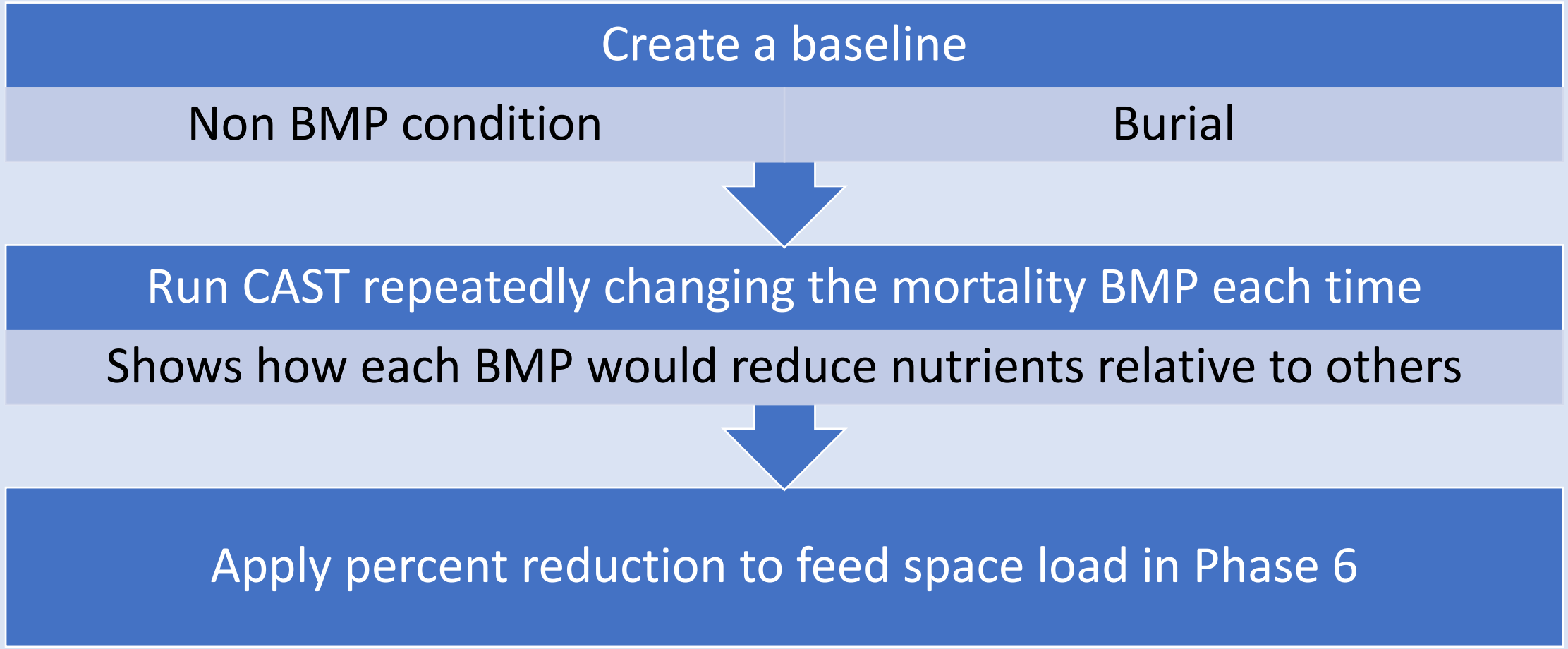
First tried to apply a reduction to CAST

There was no explicit load for mortality

Caused CAST to add in a load to be reduced by mortality BMPs

Caused an increase in overall loads

Phase 6 implementation: A solution



Efficiency Values for Practices

Pollutant	Burial	Compost	Incineration	Rendering
TN	0	0.124%	0.372%	0.372%
TP	0	0.059%	0.059%	0.059%
TSS	N/A	N/A	N/A	N/A

How can we improve in Phase 7?

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How can we improve in Phase 7?

- Calculate mortality nutrients

Table ES.3. Percentage of manure and mortality nitrogen and phosphorus contributed by mortalities for typical animal operations in the Chesapeake Bay Watershed.

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How can we improve in Phase 7?

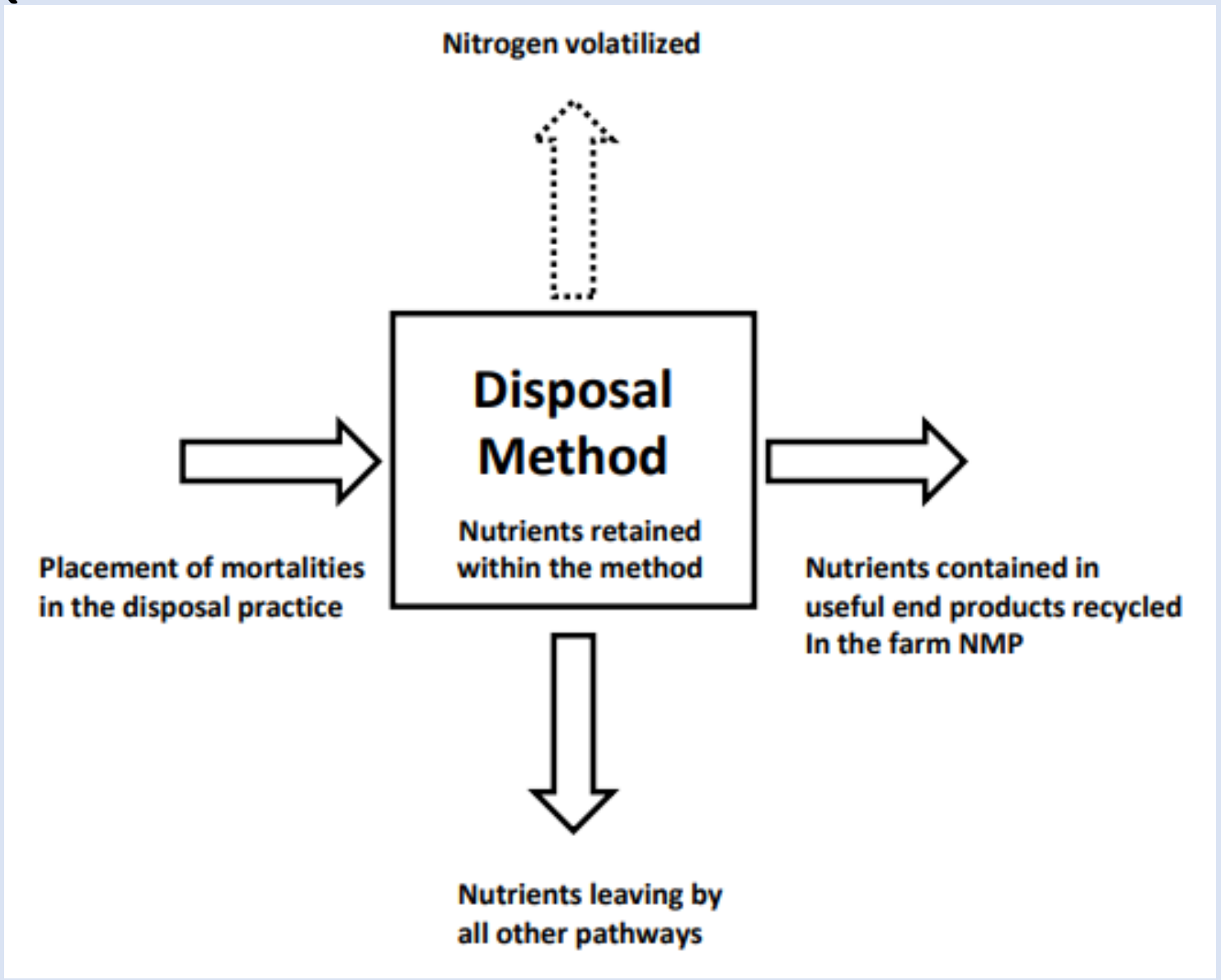
- Calculate mortality nutrients
- Perform calculations on percent recovered or removed.

Table II.1.1. Potential movement of nutrients during implementation of a disposal method, fallback values.

	Mass Percentage of Carcass Nutrients Exiting the Method (%)				
	Nutrients recycled with end products in the farm nutrient management plan		Nutrients emitted to the atmosphere	Nutrients leaving the method by all other pathways	
Disposal Method	**TN**	**TP**	**TN**	**TN**	**TP**
Burial	0	0	0	15	5
Composting	80	100	10	10	0
Incineration	25	100	75	0	0
Landfilling	0	0	0	0	0
Rendering	0	0	0	0	0

What is the ask

- Should adopt a different methodology to simulate mortality nutrients?



Questions?